

# PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2001-183722

(43)Date of publication of application : 06.07.2001

(51)Int.Cl.

G03B 13/12

B21J 13/02

G02B 7/04

(21)Application number : 11-364711

(71)Applicant : KONICA CORP

(22)Date of filing : 22.12.1999

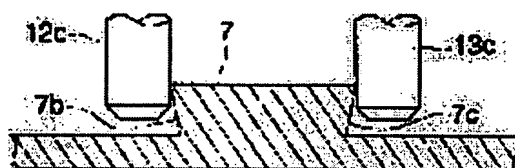
(72)Inventor : KANO MITSUHISA  
IWAIDA KENICHI

## (54) CAMERA AND METAL MOLD FOR MOLDING CAM MEMBER FOR CAMERA

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To provide a camera constituted so that the position of a variable power lens is not varied in the optical axis direction even when a cam pin or a cam plate is varied up and down.

**SOLUTION:** This camera is provided with a lens barrel holding a zoom lens, a zoom finder optical system having the variable lens moved in the optical axis direction, the cam pin projecting from the variable lens or a lens frame holding the variable lens and a cam member having a cam surface abutting on the side wall of the cam pin and driving the cam pin by interlocking with the movement of the lens barrel. Then, the cam surface abuts on the side wall of the cam pin only at the end of the variable lens side and the cam surface except the end is retreated from the side wall of the cam pin.



## LEGAL STATUS

[Date of request for examination]

09.03.2004

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than  
the examiner's decision of rejection or  
application converted registration]

[Date of final disposal for application]

[Patent number] 3817997

[Date of registration] 23.06.2006

[Number of appeal against examiner's  
decision of rejection]

[Date of requesting appeal against examiner's  
decision of rejection]

[Date of extinction of right]

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**Notes:**

1. Untranslatable words are replaced with asterisks (\*\*\*\*).
2. Texts in the figures are not translated and shown as it is.

Translated: 21:52:37 JST 09/14/2007

Dictionary: Last updated 09/07/2007 / Priority: 1. Mechanical engineering / 2. Electronic engineering / 3. Mathematics/Physics

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**FULL CONTENTS**

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**[Claim(s)]**

[Claim 1] The camera cone holding a zoom lens, and the zoom finder optical system which has the variable power lens which moves in the direction of an optical axis, In the camera equipped with the cam member which has the cam side which contacts the cam pin projected from the lens frame holding said variable power lens or said variable power lens, and the side attachment wall of this cam pin, is interlocked with dislodging of said camera cone, and drives said cam pin It is the camera characterized by for said cam side having contacted the side attachment wall of said cam pin only at the edge by the side of said variable power lens, and having evacuated the cam side except this edge from the side attachment wall of said cam pin.

[Claim 2] It has the cam side which contacts the side attachment wall of the cam pin projected from the lens frame holding the variable power lens which moves in the direction of an optical axis and performs variable power of a zoom finder optical system, or said variable power lens. In the molding public-funds type of the cam member for cameras for molding the cam member which is interlocked with dislodging of the camera cone holding a zoom lens, and drives said cam pin It is the molding public-funds type of the cam member for cameras characterized by moving the die which said cam side contacted the side attachment wall of said cam pin only at the edge by the side of said variable power lens, has evacuated the cam side except this edge from the side attachment wall of said cam pin, and molds said cam side in the direction which carries out an abbreviation rectangular cross with the shaft orientations of said cam pin.

[Claim 3] The camera cone holding a zoom lens, and the zoom finder optical system which has the variable power lens which moves in the direction of an optical axis, The case holding said zoom finder optical system, and the cam pin projected from the lens frame holding said variable power lens or said variable power lens, While having the cam side which contacts the side attachment wall of this cam pin, being interlocked with dislodging of said camera cone and

driving said cam pin The camera characterized by the thing which formed in said case and one above said a part of cam member, and for which it came floating and the prevention member has been arranged at least irrespective of the movement zone of said cam member in the camera equipped with the cam member arranged in the gap of said camera cone and said case.

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#### [Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the molding public-funds type of the camera equipped with the cam member which is interlocked with dislodging of the camera cone holding a zoom lens, and performs variable power of a zoom finder, and the cam member for cameras.

[0002]

[Description of the Prior Art] In the camera equipped with the taking lens which consists of a zoom lens, it has the zoom finder which is interlocked with zooming and performs variable power. That is, if the camera cone holding a zoom lens moves in the direction of an optical axis by zooming, the cam plate which is interlocked with this and has a cam side will move. There is a variable power lens which moves in the direction of an optical axis in a zoom finder, a cam pin projects from the lens frame holding a variable power lens or a variable power lens, and it is engaging with the cam side of a cam plate. Therefore, by dislodging of a cam plate, a variable power lens moves in the direction of an optical axis, and variable power of a zoom finder is performed.

[0003]

[Problem to be solved by the invention] An expanded sectional view shows one example of the above-mentioned cam plate to drawing 7 . Two cam pins 51 and 52 have projected from the variable power lens of the zoom finder optical system, and the side attachment wall of a cam pin 51 assumes that the cam side 53a of the cam plate 53 was contacted, and the side attachment wall of a cam pin 52 is in contact with the cam side 53b of the cam plate 53. As for the cam plate 53, it is common that resin molding is carried out, and since die omission is carried out to above [ of drawing ], the draft is needed for the cam sides 53a and 53b, and if it exaggerates, an inclined plane like drawing is formed.

[0004] Here, struggling in the dimension of a variable power lens, struggling of the assembly location of the case holding a zoom finder optical system, struggling of the assembly location of the cam plate 53, etc. arise actually. For this reason, as shown in drawing 7 , the relative position of the cam plate 53 to cam pins 51 and 52 may vary in the location of a broken line

from the location of a continuous line in a sliding direction. As a result, since the contact location of cam pins 51 and 52 and the cam sides 53a and 53b varies in a horizontal direction, the location of a variable power lens will vary in the horizontal direction of an optical axis, i.e., the direction of a zoom finder optical system, and exact variable power operation will be performed.

[0005] Even if this invention is made in view of this problem and a cam pin and a cam plate vary up and down, the location of a variable power lens sets it as the 1st object to propose the camera which does not vary in the direction of an optical axis.

[0006] Moreover, it sets it as the 2nd object to propose the molding public-funds type of the cam member for cameras which molds such a cam plate.

[0007] Furthermore, when the cam plate is held in the gap of the camera cone holding a zoom lens, and the case holding a zoom finder optical system, and a cam plate moves to right and left, the presser foot by a case becomes inadequate and a cam plate will come floating. Then, a cam side inclines from a reference position and exact cam actuation becomes impossible.

[0008] It sets it as the 3rd object to propose the camera which prevented float going up of such a cam plate with easy architecture.

[0009]

[Means for solving problem] The 1st above-mentioned object is solved by the following means.

[0010] The camera cone holding a zoom lens, and the zoom finder optical system which has the variable power lens which moves in the direction of an optical axis, In the camera equipped with the cam member which has the cam side which contacts the cam pin projected from the lens frame holding said variable power lens or said variable power lens, and the side attachment wall of this cam pin, is interlocked with dislodging of said camera cone, and drives said cam pin It is the camera characterized by for said cam side having contacted the side attachment wall of said cam pin only at the edge by the side of said variable power lens, and having evacuated the cam side except this edge from the side attachment wall of said cam pin.

[0011] The 2nd above-mentioned object is solved by the following means. It has the cam side which contacts the side attachment wall of the cam pin projected from the lens frame holding the variable power lens which moves in the direction of an optical axis and performs variable power of a zoom finder optical system, or said variable power lens. In the molding public-funds type of the cam member for cameras for molding the cam member which is interlocked with dislodging of the camera cone holding a zoom lens, and drives said cam pin It is the molding public-funds type of the cam member for cameras characterized by moving the die which said cam side contacted the side attachment wall of said cam pin only at the edge by the side of said variable power lens, has evacuated the cam side except this edge from the side

attachment wall of said cam pin, and molds said cam side in the direction which carries out an abbreviation rectangular cross with the shaft orientations of said cam pin.

[0012] The 3rd above-mentioned object is solved by the following means. The camera cone holding a zoom lens, and the zoom finder optical system which has the variable power lens which moves in the direction of an optical axis, The case holding said zoom finder optical system, and the cam pin projected from the lens frame holding said variable power lens or said variable power lens, While having the cam side which contacts the side attachment wall of this cam pin, being interlocked with dislodging of said camera cone and driving said cam pin The camera characterized by the thing which formed in said case and one above said a part of cam member, and for which it came floating and the prevention member has been arranged at least irrespective of the movement zone of said cam member in the camera equipped with the cam member arranged in the gap of said camera cone and said case.

[0013]

[Mode for carrying out the invention] The form of the operation in the camera of this invention is explained in detail with reference to drawing.

[0014] First, the connection between a camera cone and a zoom finder is explained with reference to drawing 1. Drawing 1 is perspective views, such as a camera cone and a zoom finder.

[0015] 1 is a camera cone holding the zoom lens which is a taking lens, and 2 is a zoom finder. If the zoom button which is not illustrated is operated, the gearing 5 which the motor 3 rotated and was prepared in the camera cone 1 through the 1st speed reducing gear train 4 will be rotated. Then, a revolution of a gearing 5 is transmitted to the internal device of a camera cone 1, drives the lens group inside a camera cone, and performs zooming. The revolution of the 1st speed reducing gear train 4 is transmitted to the partial gearing 7a prepared in the cam plate 7 through the 2nd speed reducing gear train 6, and makes the horizontal direction of drawing rotate the cam plate 7. In addition, the cam plate 7 is arranged in the gap of a camera cone 1 and a zoom finder 2.

[0016] Next, the architecture of a zoom finder 2 is explained with reference to drawing 2. Drawing 2 is the cross-sectional view of a zoom finder.

[0017] The objective optical system 15 is formed with the 1st lens 11 whose optical system of a zoom finder 2 is a fixed lens, the 2nd lens 12 which is a variable power lens, the 3rd lens 13 which is a variable power lens, and the 4th lens 14 which is a fixed lens. After that, a refracting optical system is formed by a prism 16, and the eyepiece optical system is continuously formed with the eyepiece 18.

[0018] In the objective optical system 15, the 1st lens 11 and the 4th lens 14 move the 2nd lens 12 and the 3rd lens 13 in the direction of an optical axis in accordance with the advice shafts 22 and 23, although fixed to the case 21. Although the zooming operation of a camera

cone 1 is interlocked with, and the cam plate 7 rotates and being later mentioned in detail like the above-mentioned, the 2nd lens 12 and the 3rd lens 13 move in the direction of an optical axis by rotation of the cam plate 7. By this, the focal distance of the objective optical system 15 will change, and a zoom finder optical system will carry out variable power.

[0019] After object light enters into the objective optical system 15, and the object light injected from the objective optical system 15 enters into a prism 16 and reflecting twice, it injects, but this projection surface is the focusing position of the objective optical system 15, and object light carries out image formation. This image that carried out image formation is reflected with a reflector 17, and it will expand with the eyepiece 18 and will observe.

[0020] In addition, the field frame 24 is arranged in the projection surface of the prism 16, and the field of view of the finder is specified.

[0021] Moreover, the reflector 17 serves as a Dach mirror with which the longitudinal-section configuration is dented in the shape of a V character.

[0022] Although the image formed of the objective optical system 15 has done a handstand vertically and horizontally, since it reflects in a sliding direction twice in a reflector 17 and reflects in a horizontal direction once in a reflector 17 twice by a prism 16, it can check by looking as an image which stood erect vertically and horizontally with the eyepiece 18.

[0023] Next, the architecture which moves the 2nd lens 12 which is a variable power lens, and the 3rd lens 13 in the direction of an optical axis with the cam plate 7 is explained with reference to drawing 3 . <A HREF="/AIPN/odse\_itm\_draw.ipdl?

N0000=7434&N0500=1E\_N/;><>7<8== //////////////&N0001=207&N0552=9&N0553=000005" TARGET="odse\_itm\_draw"> drawing 3 is perspective views, such as a cam plate and a variable power lens.

[0024] It sees from a transverse plane, the cylindrical guiding part 12a is formed in the lower right of the 2nd lens 12 at the 2nd lens 12 and one, and the cylindrical guiding part 13a is similarly formed in the lower right of the 3rd lens 13 at the 3rd lens 13 and one. The advice shaft 22 has penetrated to the pore prepared in this cylindrical guiding part 12a and cylindrical guiding part 13a. Moreover, it sees from a transverse plane, and cuts and lacks in the 2nd lens 12 and one at the upper left of the 2nd lens 12, and 12b is prepared, it cuts and lacks in the 3rd lens 13 and one at the upper left of the 3rd lens 13 similarly, and 13b is prepared. this -- it cuts, and it cut with 12b, and it lacks and the advice shaft 23 has penetrated [ it lacked and ] to 13b.

[0025] Moreover, a cam pin 12c is formed in the lower part of the cylindrical guiding part 12a of the 2nd lens 12, and the cam pin 13c is formed in the lower part of the cylindrical guiding part 13a of the 3rd lens 13. Furthermore, 12d of spring credit is prepared in the flank of the cylindrical guiding part 12a, 13d of spring credit is prepared in the flank of the cylindrical guiding part 13a, it pulls to both, and the spring 25 is hung. Therefore, it pulls and cam pins

12c and 13c are energized in the direction approached mutually with the spring 25.

[0026] Like the above-mentioned, the cam plate 7 is arranged under the zoom finder 2, and the cam plate 7 has the cam sides 7b and 7c. And the side attachment wall of a cam pin 12c is welded by pressure to the cam side 7b, and the side attachment wall of a cam pin 13c is welded by pressure to the cam side 7c.

[0027] Since a cam pin 12c will be moved by the cam side 7b and a cam pin 13c will be moved by the cam side 7c if a camera cone 1 is interlocked with and the cam plate 7 rotates to an arrow direction like the above-mentioned by this, the 2nd lens 12 and the 3rd lens 13 are moved in the direction of an optical axis in accordance with the advice shafts 22 and 23.

[0028] Next, the cam sides 7b and 7c are explained in full detail with reference to drawing 4. Drawing 4 is the expanded sectional view of a cam plate.

[0029] The cam sides 7b and 7c are formed in dip contrary to the conventional technique. Thereby, the side attachment wall of the cam pin 12c contacted only at the edge by the side of the 2nd lens 12 in the cam side 7b, and the cam side 7b except an edge is evacuated from the cam pin 12c. Moreover, the side attachment wall of the cam pin 13c contacted only at the edge by the side of the 3rd lens 13 in the cam side 7c, and the cam side 7c except an edge is evacuated from the cam pin 13c. Therefore, even if struggling in the dimension of a variable power lens, struggling of the assembly location of a case 21, struggling of the assembly location of the cam plate 7, etc. arise When the cam plate 7 is in the same location, like the conventional technique, it does not produce changing a cam pin 12c and cam pin [ 12d ] spacing, but the 2nd lens 12 and the 3rd lens 13 always perform dislodging defined by the cam sides 7b and 7c.

[0030] In addition, after making it move to the upper part after using a slide core method for a cam side as the molding approach and moving a die to a left about the cam side 7b, and moving a die to the method of the right about the cam side 7c, it is made to move to the upper part. By this, it can mold also by the configuration of ANDAKATTO like drawing 4.

[0031] Next, how the hold of the cam plate 7 is carried out is explained with reference to drawing 5 and drawing 6. The sectional view of the cam plate 7 with drawing 5 parallel to an optical axis and drawing 6 are the sectional views of the cam plate 7 which intersects perpendicularly with an optical axis.

[0032] Like the above-mentioned, the cam plate 7 is arranged in the gap of a camera cone 1 and a zoom finder 2, and the location of the sliding direction is defined. Moreover, the projected part 1a circularly formed in the back of a camera cone 1 is engaging with 7d of long slots established in the underside of the cam plate 7, and the cam plate 7 is positioned in the direction of an optical axis.

[0033] In addition, the cam plate 7 is formed in the shape of [ in alignment with a camera cone 1 ] radii, and rotates centering on an optical axis. If the right-and-left width of the cam plate 7 is

expressed with an include angle  $\theta$  centering on an optical axis, the cam plate 7 will rotate greatly right and left so that clearly [ drawing 6 ]. At this time, whichever it comes floating to the front part of a case 21, the prevention part 21a is formed in one and the cam plate 7 rotates [ on either side ] as it is always stopping that the cam plate 7 comes floating upwards, it comes floating certainly and float going up is prevented by the prevention part 21a.

[0034] In addition, it comes floating, as shown in drawing 1 , and the screw stop of the right-and-left edge of the prevention part 21a is carried out to the camera cone 1 with the machine screw 8.

[0035] Although it had architecture which made the cam pin project in one from a variable power lens, it is not limited to this, the lens frame holding a variable power lens may be prepared, and a cam pin may be made to project from this lens frame in the form of the above operation.

[0036] Moreover, although the cam member in Claims is equivalent to the cam plate 7, the cam member does not necessarily need to be formed circularly and may be plate-like.

[0037]

[Effect of the Invention] Struggling in the assembly location of the case which holds struggling in the dimension of a variable power lens, and a zoom finder optical system according to the camera according to claim 1, Even if the relative position of a cam pin and a cam plate varies up and down by struggling in the assembly location of the cam plate 53 etc., the location of a variable power lens cannot vary in the direction of an optical axis, and variable power of a zoom finder optical system can be performed correctly.

[0038] According to the molding public-funds type of the cam member for cameras according to claim 2, molding becomes possible easily about the cam member which does so the effectiveness like a camera according to claim 1.

[0039] According to the camera according to claim 3, float going up of a cam plate can be prevented with easy architecture.

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#### [Brief Description of the Drawings]

[Drawing 1] They are perspective views, such as a camera cone and a zoom finder.

[Drawing 2] It is the cross-sectional view of a zoom finder.

[Drawing 3] They are perspective views, such as a cam plate and a variable power lens.

[Drawing 4] It is the expanded sectional view of a cam plate.

[Drawing 5] It is the sectional view of a cam plate parallel to an optical axis.

[Drawing 6] It is the sectional view of the cam plate which intersects perpendicularly with an optical axis.

[Drawing 7] It is the expanded sectional view of the conventional cam plate.

[Explanations of letters or numerals]

1 Camera Cone

2 Zoom Finder

7, 53 Cam plate

7b, 7c, 53a, 53b Cam side

12 2nd Lens

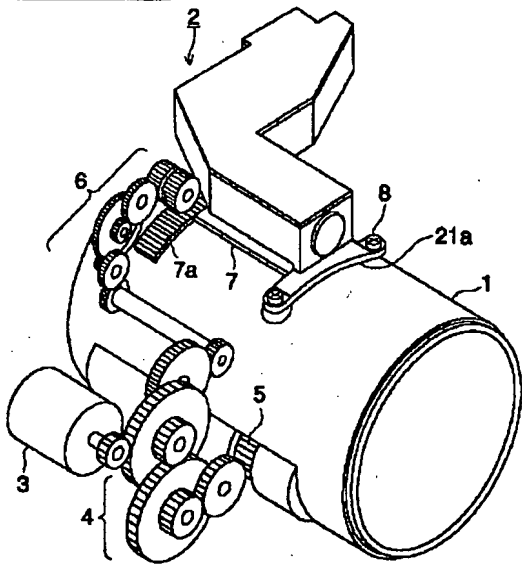
12c, 13c, 51, 52 Cam pin

13 3rd Lens

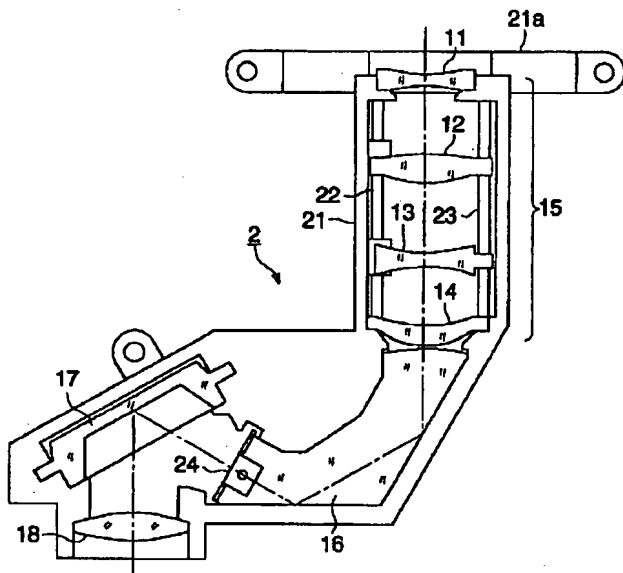
21 Case

21a Come floating and it is a prevention part.

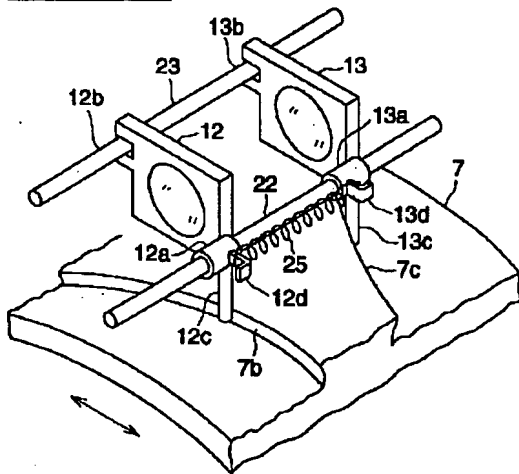
[Drawing 1]



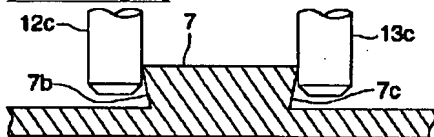
[Drawing 2]



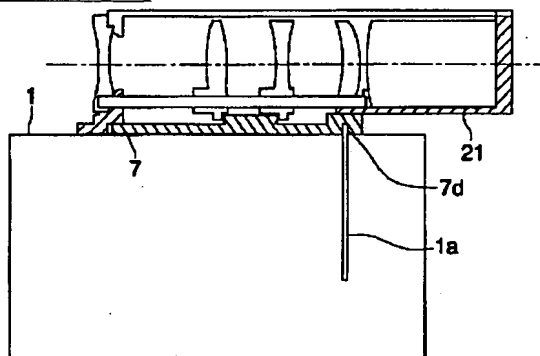
[Drawing 3]



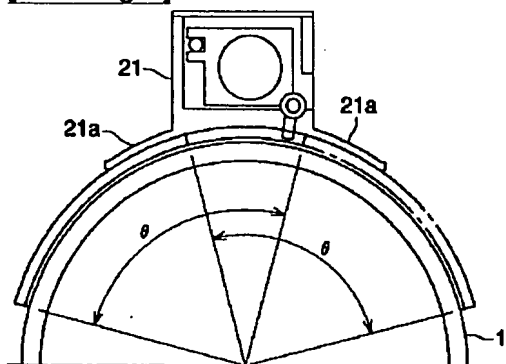
[Drawing 4]



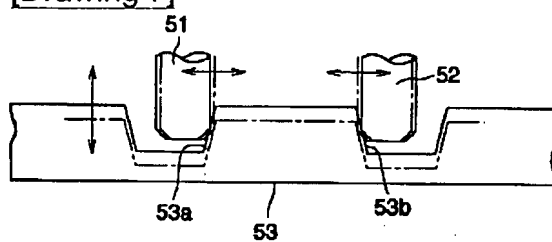
[Drawing 5]



[Drawing 6]



[Drawing 7]



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[Translation done.]